Homework #3a: Phys 3320:   Prof. Olness   Fall 2015

Due Friday Oct. 2 before class (9am)

Consider a circuit with a resistor (R), capacitor (C), or inductor (L), and this is driven by an AC source: V sin[w t]. (If you prefer, you can use an exponential form.)

Part 1a) the circuit with the resistor R, compute the impedance Z, the current and voltage across the resistor as a function of time. What is the relative phase of the voltage and current?

Part 1b,c) Repeat for b) the capacitor C and c) the inductor L.

Part 2) Repeat for an RLC circuit. Compute the impedance Z, the current and voltage across the resistor as a function of time. What is the relative phase of the voltage and current? Plot the current through the system as a function of the frequency w. Why is this called a band-pass filter?